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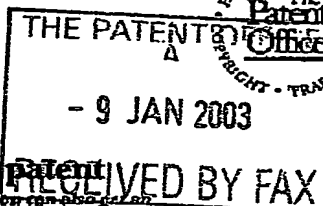
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Dated 2 February 2004

## Patents Form 1/77

Patents Act 1977  
(Rule 16)09JAN03 E775828-1 D10002  
P01/7700 0.00-0300472.8

## Request for grant of a patent

(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)

The Patent Office

Cardiff Road  
Newport  
South Wales  
NP10 8QQ

## 1. Your reference

ids.2700.uk.jae

## 2. Patent application number

(The Patent Office will fill in this part)

0300472.8

09 JAN 2003

## 3. Full name, address and postcode of the or of each applicant (underline all surnames)

Infinite Data Storage Ltd  
1 Pitreavie Court  
DUNFERMLINE  
KY11 8UG

Patents ADP number (if you know it)

If the applicant is a corporate body, give the country/state of its incorporation

United Kingdom

8465486001

## 4. Title of the invention

Single piece optical mechanical assembly  
for optical data storage engines

## 5. Name of your agent (if you have one)

Kennedys Patent Agency Limited

"Address for service" in the United Kingdom  
to which all correspondence should be sent  
(including the postcode)Floor 5, Queens House  
29 St Vincent Place  
GLASGOW  
G1 2DT

Patents ADP number (if you know it)

8058240002

## 6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number

Country

Priority application number  
(if you know it)Date of filing  
(day / month / year)

## 7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application

Date of filing  
(day / month / year)

## 8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if:

- a) any applicant named in part 3 is not an inventor, or
- b) there is an inventor who is not named as an applicant, or
- c) any named applicant is a corporate body.

See note (d))

YES

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## Patents Form 1/77

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Continuation sheets of this form -

Description 7

Claim(s) -

Abstract -

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Priority documents -

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Statement of inventorship and right to grant of a patent (Patents Form 7/77) -

Request for preliminary examination and search (Patents Form 9/77) -

Request for substantive examination (Patents Form 10/77) -

Any other documents (please specify) -

11.

I/We request the grant of a patent on the basis of this application.

Signature

Kennedy  
Kennedys

Date 9/01/03

12. Name and daytime telephone number of person to contact in the United Kingdom

Jim Adams Tel: 0141 226 6826

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Patents Form 1/77

1 Single piece Optical Mechanical Assembly for optical data  
2 storage engines  
3

4 The present invention relates to recordable / re-writable  
5 optical storage technology, especially portable CD and  
6 DVD drives. In particular, the invention relates to  
7 mechanical improvements to the drive design, which can  
8 reduce cost, improve tolerancing and build time.  
9

10 The basis for nearly all optical data storage systems to  
11 date has been the Compact Disc format proposed by Philips  
12 and Sony, some 20 years ago. This standard has been  
13 modified from the original audio storage, to include data  
14 of all formats, and also Recordable / re-writable  
15 versions. The CD has become a familiar standard, and the  
16 flexibility has lead to an increasing variety of uses.  
17 The creation of DVD over the last few years has expanded  
18 the capacity of optical data storage available to the  
19 consumer, whilst maintaining a familiar look and feel. In  
20 particular, growth has been seen in portable solutions,  
21 and these portable solutions have specific requirements  
22 separate from the needs of a PC based solution. The needs  
23 of a portable solution include small size, and improved

1 power consumption. Additionally portable optical data  
2 storage solutions can often be directed more towards the  
3 consumer electronic environment, which has very tight  
4 cost restrictions.

5  
6 An optical data storage device consists of a number of  
7 sections which can be divided into mechanical, electronic  
8 and firmware. Historically Optical Mechanical Assemblies  
9 (OMA) for use in CD, CDRW, DVD and recordable DVD drives  
10 require a chassis which has location features to mount  
11 the guide rail and the leadscrew (for location of the  
12 Optical Pick Up (OPU) reading / recording head), the sled  
13 motor which traverses the OPU across the data area of the  
14 disc and the spindle motor for spinning the disc. The  
15 spindle motor typically is purchased from a specialised  
16 motor supplier who would supply the motor with a mounting  
17 plate for attachment to the chassis via screws. Typically  
18 in portable optical data storage systems, a scaled down  
19 version of the OMA used in non-portable applications,  
20 such as PC CD drives etc, is created. Designs are known  
21 that have enabled the integration of the OMA unit within  
22 the drive body thus reducing some component count and  
23 tolerancing. However, the integrated OMA still required a  
24 separate motor assembly and sled drive system, and was  
25 suitable for a complete product design only, rather than  
26 an "engine" solution for use in a wide variety of  
27 products.

28  
29 It would be advantageous to reduce the overall size of  
30 the OMA and reduce the part count and hence cost.

31  
32 It would be further advantageous to improve the  
33 tolerancing of the OMA, in particular the location of the

1 leadscrew and guide rail, which improve tilt performance.  
2 The improved tilt performance can reduce manufacturing  
3 time and risk.  
4

5 It would be further advantageous to increase the rigidity  
6 and stability of the OMA, and in particular its response  
7 to high speed operation.  
8

9 It is an object of the present invention to provide an  
10 improved chassis for the Optical Mechanical Assembly for  
11 an optical data storage device.  
12

13 According to a first aspect of the present invention  
14 there is provided a single piece chassis for use in  
15 portable optical data storage applications.  
16

17 According to a second aspect of the present invention  
18 there is provided an Optical Mechanical Assembly (OMA)  
19 for use in portable optical data storage applications,  
20 comprising a single piece chassis.  
21

22 Preferably said chassis is the mounting plate for the  
23 motor shaft of the disc spindle motor.  
24

25 Preferably said chassis is the mounting plate for the  
26 windings of the disc spindle motor.  
27

28 Preferably said chassis is the mounting plate for the  
29 control circuit of the disc spindle motor.  
30

31 Preferably the chassis comprises metal.  
32

1 Preferably said chassis is the mounting plate for the  
2 sled motor.

3

4 Preferably said chassis is the mounting plate for the  
5 drive system.

6

7 Preferably said chassis is the mounting plate for the  
8 leadscrew.

9

10 Preferably said chassis is the mounting plate for a first  
11 guide rail.

12

13 Preferably the sled motor motion is driven onto the  
14 leadscrew via a gearbox assembly.

15

16 Alternatively the sled motor motion is driven directly  
17 from a stepper motor onto the leadscrew.

18

19 Preferably a second guide rail is mounted on the chassis  
20 and the sled drive from the leadscrew acts on the OPU via  
21 this second guide rail using a cam. This reduces  
22 vibrational susceptibility.

23

24 Preferably screws are used to allow for OPU tilt  
25 adjustment. Preferably the screws are mounted on both  
26 ends of the first guide rail, and one end of the  
27 leadscrew.

28

29 Preferably there are three screws.

30

31 Optionally the screws are mounted on both ends of the  
32 leadscrew and one end of the first guide rail.

33

1 Preferably the screws are mounted on both ends of one of  
2 the first or second guide rails, and one end of the other  
3 to allow for OPU tilt adjustment.

4

5 Preferably the screws are spring mounted.

6

7 In order to provide a better understanding of the present  
8 invention, an embodiment will now be described by way of  
9 example only and with reference to the accompanying  
10 Figures, in which:

11

12 Figure 1 illustrates, in schematic form an optical  
13 mechanical assembly, in accordance with a preferred  
14 embodiment of the present invention; and

15

16 Figure 2 illustrates, in schematic form a conventional  
17 optical mechanical assembly.

18

19 The present invention is an OMA chassis that is  
20 manufactured from a single piece of material. This  
21 chassis replaces the spindle motor base plate, and  
22 preferably the mounting for the sled motor, and may  
23 contain locators for the leadscrew and guide rail.

24

25 With reference to Figure 1, the OMA 10 incorporates the  
26 metal mounting plate 14 of the motor 12 into the metal  
27 chassis plate 14 of the OMA. The metal part of the  
28 chassis is thus manufactured with an additional area  
29 where the motor is sited. The chassis plate then has the  
30 motor shaft, windings and control circuit mounted to it  
31 directly thus combining the motor plate and the chassis.  
32 Rigid materials other than metal may be used.

33



1 The chassis also acts as the mounting plate for the sled  
2 motor 16 and drive system and as the mounting for the  
3 leadscrew 18 that moves the drive cam 20.

4

5 The chassis also acts as the mounting plate for the guide  
6 rail 22 required for the Optical PickUp (OPU) 24.

7

8 The OPU sled motor motion may be driven onto the  
9 leadscrew via a gearbox assembly.

10

11 The sled motor motion may be driven directly from a  
12 stepper motor onto the leadscrew.

13

14 An additional guide rail 26 is mounted and the sled drive  
15 from the lead screw acts on the OPU via this additional  
16 guide rail using the cam, thus reducing vibrational  
17 susceptibility.

18

19 Three spring mounted screws are used to allow for OPU  
20 tilt adjustment. The three screws may be mounted on  
21 either end of the guide rail, and one end of the  
22 leadscrew. Alternatively the three screws may be mounted  
23 either end of the leadscrew and one end of the guide  
24 rail. The three spring mounted screws are used to allow  
25 for OPU tilt adjustment. The three screws may be mounted  
26 on either end of one of the guide rails, and one end of  
27 the other.

28

29 Flex connectors 28 are also shown.

30

31 With reference to Figure 2, that shows a conventional OMA  
32 30 for use in CD, CDRW, DVD and recordable DVD drives,  
33 the OMA incorporates a chassis 32 which has location

1 features to mount the guide rail 34, the leadscrew 36 for  
2 location of the Optical Pick Up (OPU) 38 reading /  
3 recording head, the sled motor 40 and gear train 42 which  
4 traverses the OPU across the data area of the disc and  
5 the spindle motor 44 for spinning the disc. The leadscrew  
6 provides drive to the OPU, and the motion is transferred  
7 via the use of a cam 46. The spindle motor comprises a  
8 mounting plate 48 for attachment to the chassis using  
9 screws. Flex connectors 50 are also shown.

10

11 The advantages of the present invention are a reduction  
12 in the overall size of the OMA, as well as a subsequent  
13 reduction in the part count and hence overall cost. The  
14 present invention also has the effect of improving the  
15 tolerancing of the OMA and in particular the location of  
16 the lead screw and guide rail (or both guide rails, if  
17 two are used), which has the effect of improving tilt  
18 performance. The improved tilt performance is critical to  
19 the success of optical engine solutions, and in  
20 particular recording solutions. Improvement in tilt will  
21 result in reduced manufacturing time for the OMA and also  
22 reduce the risk in the design stage. A further advantage  
23 of using the present invention is the increase in  
24 stability and rigidity of the OMA due to the single piece  
25 construction and cross support between the guide rail and  
26 leadscrew. The increase in rigidity and stability will  
27 improve the OMA performance, particularly at high speed  
28 operation.

29

30 Further modifications and improvements may be added  
31 without departing from the scope of the invention herein  
32 described.

33

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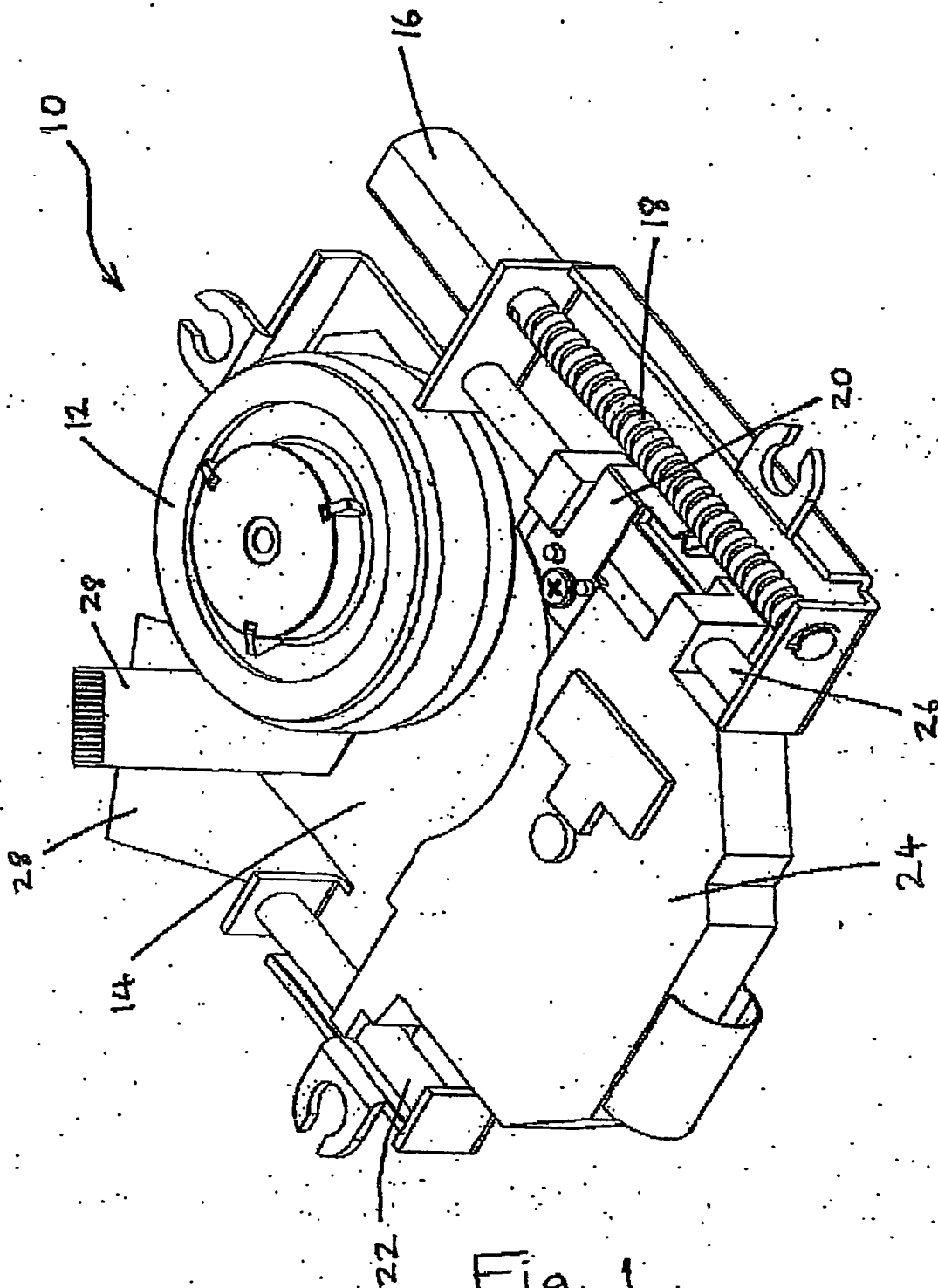


Fig. 1

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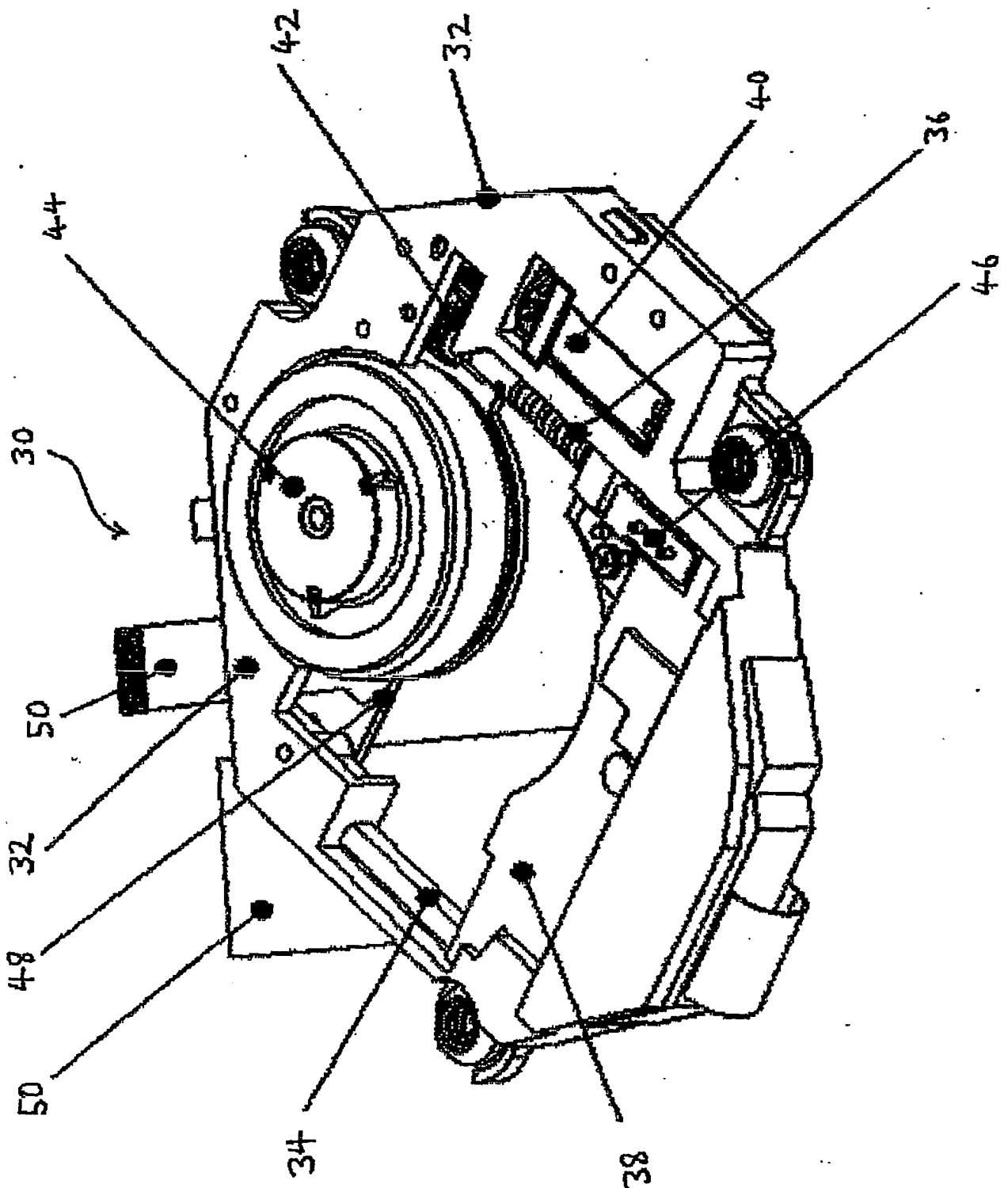


Fig. 2

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